

## Giving Your Herd the Best Chance for Successful Fertility

Achieving high levels of reproductive performance will be a major key performance indicator on most dairy farms this winter. David Wilde, Ruminant Technical Manager with Anpario, considers some nutritional factors which could have an impact on success.

*"The reasons why dairy cows do not get in-calf are numerous and complex," Mr Wilde comments. "In most cases, infertility will be a multifactorial issue rather than one single problem. Genetics, semen quality, management, feeding, housing, stress and heat detection will all have an influence."*

"Repeat oestrus cycles are not just due to a cow not conceiving. In many cases there may have been successful fertilisation of the egg and initial implantation of the embryo before this fails, leading to a new cycle. It is not unusual for there to be plenty of bulling activity but a lot of repeats."

Mr Wilde, a qualified Cow Signals Master Trainer, says it is important to consider the basic physiology, commenting that the average signs of oestrus last for just 8 hours with an average of just one standing event per hour. He says ideally insemination needs to take place about 12 hours after the first standing event with ovulation 24–28 hours after the first standing event.

"This early insemination allows the sperm to 'get in to place' and there is evidence that they form a reservoir in the oviduct. They can survive quite happily for 3–4 days, waiting for the egg to arrive before fertilisation."

He says nutrition can have a direct impact on the fine balance within the cow, which can determine the success of an insemination.

"There is a common belief that high-yielding cows are less fertile than low-yielding cows and there is a grain of truth in this, relating to the hormone status of the cow and the roles of progesterone and prostaglandin. After ovulation, the corpus luteum produces progesterone to maintain everything for implantation. High levels of progesterone also serve to provide a barrier to the next wave of eggs being produced for the next oestrus cycle, assuming the current one is not fertilised or fails to implant."

After fertilisation there is a window of just 14–16 days in which implantation can occur. Mr Wilde says once the embryo successfully implants, it releases another hormone – interferon-tau – that signals to the cow that the embryo is there and she needs to look after it.

"Sadly, it takes the developing embryo around 8–13 days to become big enough to produce this signal meaning this can coincide with the uterus now thinking that pregnancy has not happened, leading to it producing prostaglandin (PGF2 $\alpha$ ). This hormone suppresses the progesterone and terminates that specific cycle, allowing a fresh oestrus cycle to start. PGF2 $\alpha$  is a powerful hormone and if the interferon-tau from the embryo is not strong enough, it will override it and the pregnancy will terminate."

"High-yielding cows have a much higher flow of blood, resulting in a faster clearance of progesterone via the liver and consequently lower circulating levels. Less

progesterone means the PGF2 $\alpha$  is more likely to suppress the cycle. Reduced progesterone concentrations also mean that eggs that do ovulate will tend to be smaller and poorer quality."

Mr Wilde says one management approach is to suppress the production of PGF2 $\alpha$  by feeding long-chain omega 3 fatty acids, either linolenic acid (from linseed oil) or EPA and DHA from fish oils. Work at the University of Florida demonstrated that while linolenic acid could reduce the PGF2 $\alpha$  secretion by about 22%, EPA and DHA from fish oils are far more effective, reducing it by around 60%. He says adding these fats could help in the establishment and maintenance of early pregnancy.

"Many forages and feed ingredients are naturally low in omega 3s so it can be beneficial to add a supplement high in these fatty acids, such as Optomega, which is a rich source of DHA and EPA, the most biologically active omega 3 fatty acids."

Mr Wilde also advises paying close attention to dietary protein levels, commenting it is well documented that feeding excess amounts of soluble protein can reduce conception rates. He says many diets are formulated with an incorrect balance of protein seen as excess nitrogen-dependent metabolisable protein (MPN) values in rations, or too much rumen digestible protein (RDP). This could be a particular challenge with many grass silages being higher in protein than usual, which will contribute to high MPN levels.

"The rumen microbes are unable to effectively capture the soluble nitrogen, leading to the excesses being converted to ammonia in the rumen and absorbed directly into the bloodstream. Raised blood ammonia levels have the undesirable effect of altering the uterine pH which in turn reduces the chance of successful implantation of the embryo."

"It is important to monitor potential problems and milk urea is a useful tool. The problem is that milk urea results are for the whole herd, not the cow you are trying to get in calf. However, keep an eye on milk urea levels and take action if they creep above 300mg/l. If possible, look to reduce overall crude protein levels but at the same time, improve the supply of by-pass proteins to ensure the supply of useable, metabolisable protein meets requirements."

In conclusion, carefully monitoring the nutritional intake of a herd can have a significant impact on overall health and the subsequent fertility. Simply supplementing the herd's diet with fatty acids can make a big difference to the profit and loss. Increased consumption of fatty acids such as DHA and EPA means increased fertility, resulting in increased profits. *Averebes mei se parbit. Entem nesu quam*



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